CLAIMS

1. A hexagonal lithium-cobalt composite oxide for a lithium secondary cell, which is represented by the formula $LiCo_{1-x}M_xO_2$, wherein x is $0 \leqq x \leqq 0.02$ and M is at least one member selected from the group consisting of Ta, Ti, Nb, Zr and Hf, and which has a half-width of the diffraction peak for (110) face at $2\theta = 66.5 \pm 1°$, of from 0.070 to 0.180°, as measured by the X-ray diffraction using CuK_α as a ray source.

2. The hexagonal lithium-cobalt composite oxide for a lithium secondary cell according to Claim 1, wherein x is $0.0005 \leqq x \leqq 0.02$, and the half-width of the diffraction peak for (110) face is from 0.100 to 0.165°.

3. The hexagonal lithium-cobalt composite oxide for a lithium secondary cell according to Claim 1, wherein x is 0, and the half-width of the diffraction peak for (110) face is from 0.080 to 0.100°.

4. The hexagonal lithium-cobalt composite oxide for a lithium secondary cell according to Claim 1, 2 or 3, wherein the packing press density of the hexagonal lithium-cobalt composite oxide is from 2.90 to 3.35 g/cm^3.

5. A process for producing the hexagonal lithium-cobalt composite oxide for a lithium secondary cell as defined in any one of Claims 1 to 4, which comprises dry blending a cobalt oxyhydroxide powder having an average particle size of from 1 to 20 µm and a specific surface area of from 2 to 200 m^2/g, a lithium carbonate powder having an

average particle size of from 1 to 50 μm and a specific surface area of from 0.1 to 10 m^2/g, and a powder of an oxide of metal element M having an average particle size of at most 10 μm and a specific surface area of from 1 to 100 m^2/g, and firing the mixture at a temperature of from 850 to 1,000°C in an oxygen-containing atmosphere.

6. The process for producing the hexagonal lithium-cobalt composite oxide for a lithium secondary cell according to Claim 5, wherein the mixture is fired for from 4 to 30 hours.

7. A positive electrode for a lithium secondary cell, which contains the hexagonal lithium-cobalt composite oxide for a lithium secondary cell as defined in any one of Claims 1 to 4, as an active material.

8. The positive electrode for a lithium secondary cell according to Claim 7, having a mixture comprising the active material, an electrically conductive material and a binder, supported on a current collector.

9. The positive electrode for a lithium secondary cell according to Claim 7 or 8, wherein the current collector is aluminum or stainless steel.

10. A lithium secondary cell employing a positive electrode which contains the hexagonal lithium-cobalt composite oxide for a lithium secondary cell as defined in any one of Claims 1 to 4, as an active material.

11. The lithium secondary cell according to Claim 10, wherein a cyclic or chain carbonic ester is used as a

solvent for the electrolyte.